

Wind Powering America Overview

Larry Flowers

FY05 DOE Wind Implementation Meeting

November 17, 2004



Wind Powering America Strategy

Goal: By 2010, at least 100 MW installed in 30 states

| Annual Goals & Targets | | |
|------------------------|---------|-----------|
| Year | > 20 MW | > 100 MW |
| 2003 | 19 | 10 |
| 2004 | 25 | 12 |
| 2005 | 32 | 16 |
| 2006 | 34 | 19 |
| 2007 | 36 | 22 |
| 2008 | 38 | 25 |
| 2009 | 39 | 27 |
| 2010 | 40 | 30 |

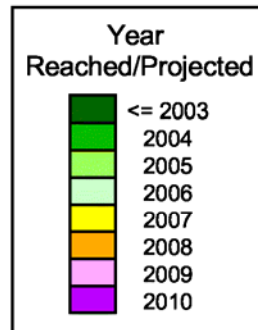
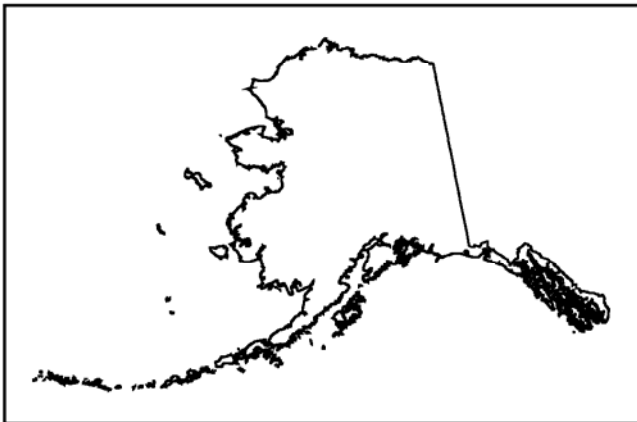
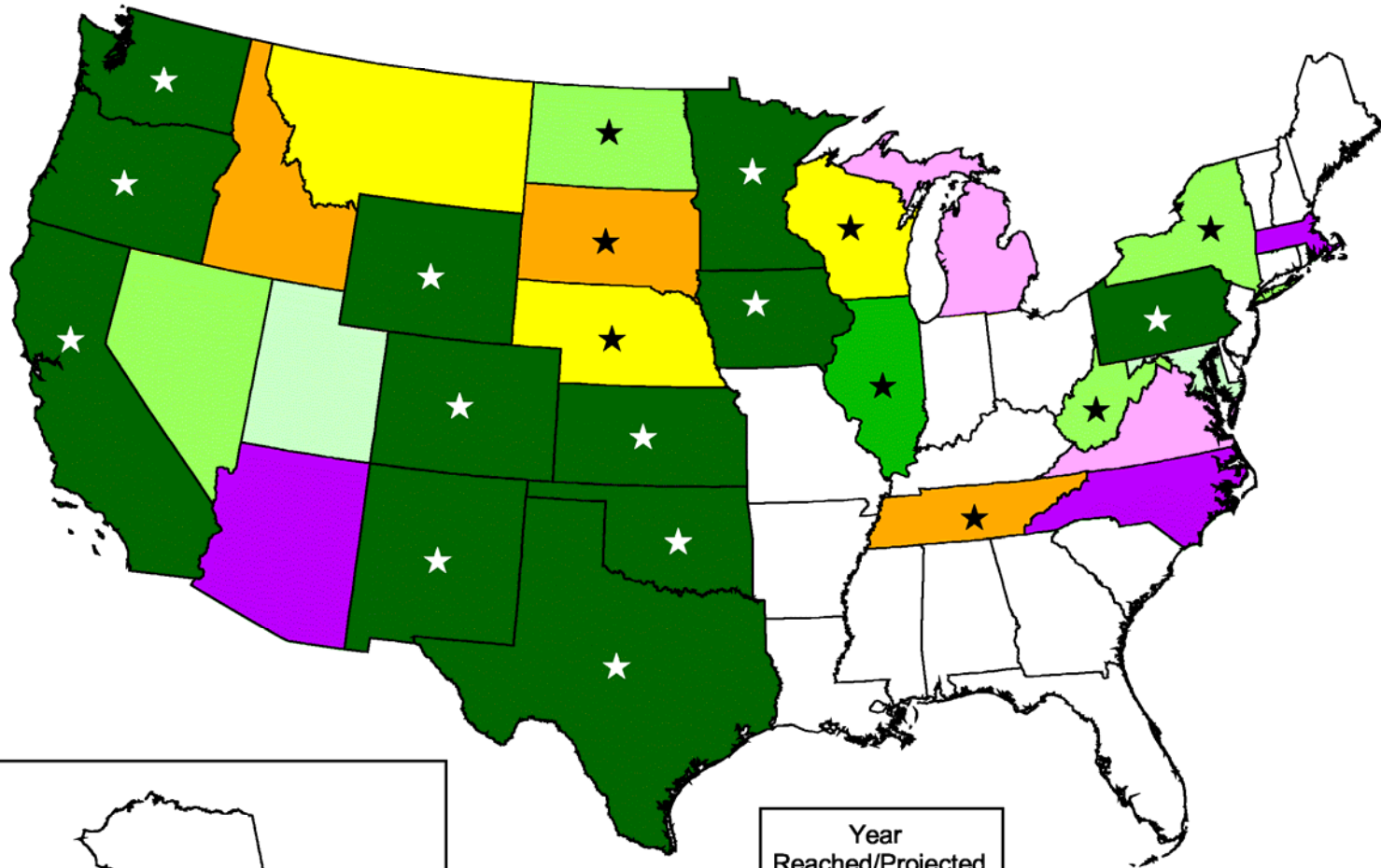
Thematic Areas

- State Wind Support
- Utility Partnerships
- Rural Economic Development
- Native American Tribal Outreach
- Distributed (Small) Wind

Select States Supported

- **Alaska**
- **Arizona**
- **California**
- **Colorado**
- Connecticut
- Delaware
- Georgia
- **Hawaii**
- **Idaho**
- *Illinois*
- Indiana
- Iowa
- **Kansas**
- Kentucky
- Maine
- **Maryland**
- Massachusetts
- **Michigan**
- Minnesota
- Missouri
- **Montana**
- *Nebraska*
- **Nevada**
- New Hampshire
- New Jersey
- **New Mexico**
- New York
- **North Carolina**
- **North Dakota**
- **Ohio**
- **Oklahoma**
- **Oregon**
- **Pennsylvania**
- Puerto Rico
- Rhode Island
- **South Dakota**
- **Utah**
- Vermont
- **Virginia**
- **Washington**
- **West Virginia**
- Wisconsin
- Wyoming

Year State Reaches 100 MW Installed Wind Capacity



★ Currently > 20 MW

U.S. Department of Energy
National Renewable Energy Laboratory



11-NOV-2004 1.1.46

State Maturity Matrix

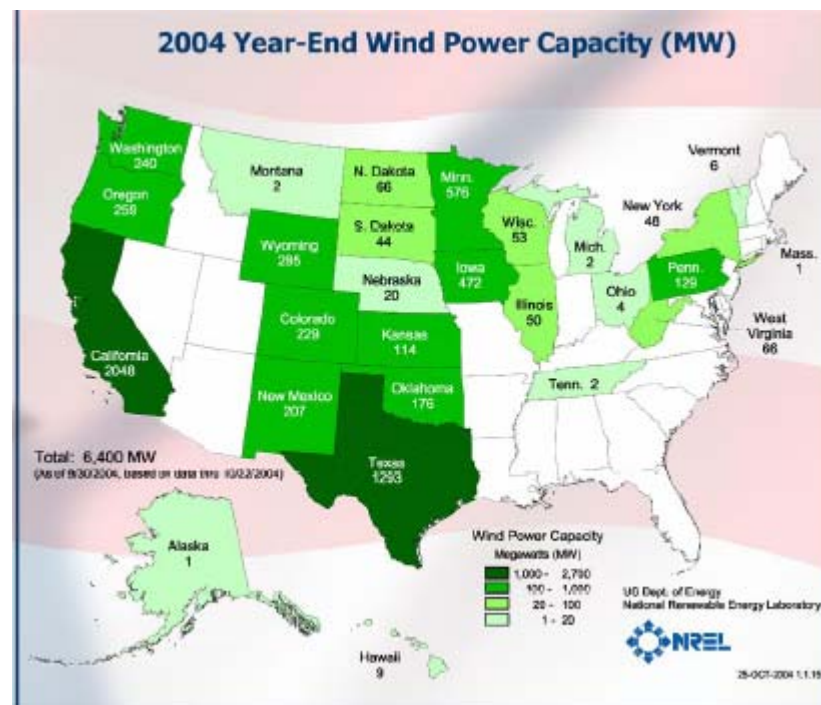
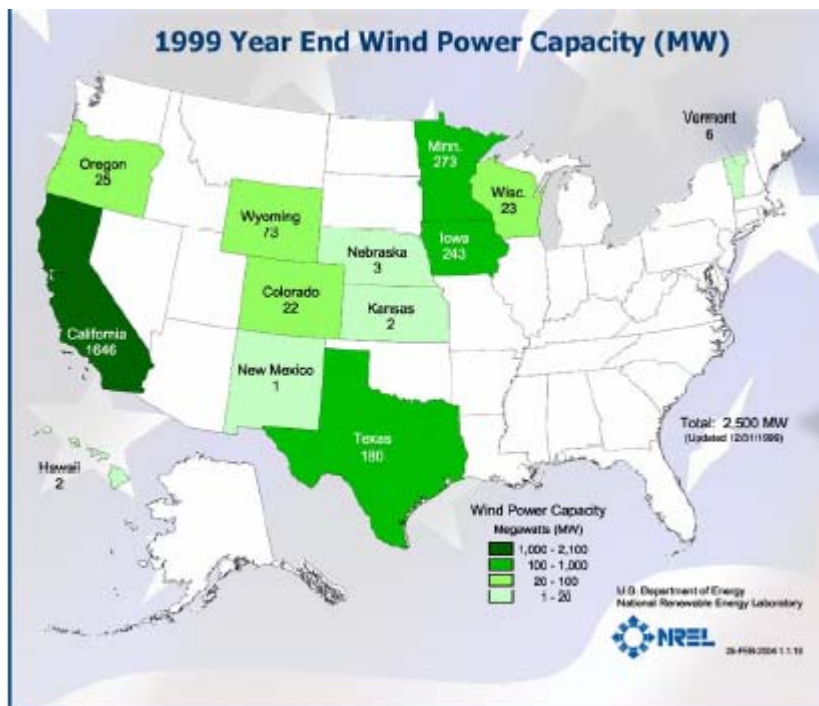
| WPA Tech Acceptance State Criteria Ranking | Seattle Region | | | | | | | | Denver Region | | | | | | | | | | |
|--|----------------|--------|--------|--------|--------|--------|--------|--------|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|
| | N V | I D | A Z | A K | H I | W A | O R | C A | C O | O K | S D | U T | N M | K S | N E | N D | M T | T X | |
| LEVEL OF ADOPTION | | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| How much capacity is installed, in both large and small turbines? | | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| What % of the state's potential is being used? | | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| What % of the state's energy use is Wind? | | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| OVERALL AWARENESS | | | | | | | | | ● | | | ● | | | | | | | |
| State Wind Working Group? Is it Self Sufficient? | | | | | | | | | ● | | | ● | | | | | | | |
| Are there Workshops & Annual State Conferences? | | | | | | | | | ● | | | ● | | | | | | | |
| LEGISLATIVE & REGULATORY ENVIRONMENT | | | | | | | | | ● | | | ● | | | | | | | |
| Is there an enabling policy environment? (RPS, PTC, etc?) | | | | | | | | | ● | | | ● | | | | | | | |
| Are there institutional partnerships with ag. groups, utilities, state ed institutions? | | | | | | | | | ● | | | ● | | | | | | | |
| SMALL WIND | | | | | | | | | ● | | | ● | | | | | | | |
| Have WPA Small Wind Guides been published? | | | | | | | | | ● | | | ● | | | | | | | |
| Are there effective Net Metering Rules? | | | | | | | | | ● | | | ● | | | | | | | |
| Enabling policy environment? (buydowns. etc) | | | | | | | | | ● | | | ● | | | | | | | |
| Are there workshops? | | | | | | | | | ● | | | ● | | | | | | | |
| Targeted efforts to produce equitable zoning considerations (height variances, setbacks) | | | | | | | | | ● | | | ● | | | | | | | |
| Is state involved with IREC small wind group? | | | | | | | | | ● | | | ● | | | | | | | |
| RESOURCE ASSESSMENT | | | | | | | | | ● | | | ● | | | | | | | |
| WPA Anemometer Loan Program? Needs met? | | | | | | | | | ● | | | ● | | | | | | | |
| Validated Resource Atlas? | | | | | | | | | ● | | | ● | | | | | | | |
| Can prospective developers estimate energy production using WPA tools? | | | | | | | | | ● | | | ● | | | | | | | |
| SITING & ZONING CONSTRAINTS | | | | | | | | | ● | | | ● | | | | | | | |
| Have all undue blanket zoning restrictions been removed? | | | | | | | | | ● | | | ● | | | | | | | |
| Do state & local Govts have standardized & equitable procedures for approval? | | | | | | | | | ● | | | ● | | | | | | | |
| EMERGING MARKETS | | | | | | | | | ● | | | ● | | | | | | | |
| Growing interest in the use of wind for local communities & schools? | | | | | | | | | ● | | | ● | | | | | | | |
| Is wind being considered for use in producing clean water? | | | | | | | | | ● | | | ● | | | | | | | |
| Is the potential for offshore deployment of wind being addressed? | | | | | | | | | n/a | | | n/a | | | | | | | |
| Are federal & state loads being served by wind? | | | | | | | | | ● | | | ● | | | | | | | |



Operating Principles

- Work at the market margins
- Leverage existing institutional partnerships
- Create strategic partnerships
- Create, educate, and support wind working groups
- Create and disseminate targeted info, analyses, and tools
- Select and address strategic challenges and special opportunities
- Utilize existing national, regional, and local expertise
- Coordinate with established wind institutional resources

Installed Wind Capacities (99-04)



WPA Management Activities

- Strategy Team
- State Summit
- BLM/USFS Policy & Analysis
- WPA Website
- Schools Pilot
- WEF Technical Support
- Advocates Awards
- FEMP Technical Assistance
- State Lands Policy
- Energy Air Nexus Analysis
- Community Wind Analysis
- Comparative Economics of Bulk Power Options
- Publications
- NWCC Participation
- Stakeholder Interviews
- Windpower 04 paper



Wind Powering Arabia



WPA Website



U.S. Department of Energy

Office of Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Wind Powering America

Regional Activities

Native Americans

Public Power

Small Wind Turbines

Agricultural Community

State Lands

Public Lands

News

- ▶ [Wind-Diesel 2004 Proceedings](#)
- ▶ [Interview: Brent Alderfer Community Energy, Inc., Wayne, PA](#)

- ▶ [Native American Wind Interest Group \(NAWIG\) Newsletter Summer 2004](#)

- ▶ [America's Schools Use Wind Energy to Further Their Goals \(PDF 271 KB\)](#)
[Download Acrobat Reader](#)

- ▶ [State Wind Working Group Handbook \(PDF 14 KB\)](#)
[Download Acrobat Reader](#)

- ▶ [AWEA addresses issues raised about wind energy \(PDF 74 KB\)](#)
[Download Acrobat Reader](#)

- ▶ [Some Common Misconceptions about Wind Power \(PDF 525 KB\)](#)
[Download Acrobat Reader](#)
- ▶ [From the "State Wind Working Group Handbook," pp. 82-87.](#)

- ▶ [Job and Economic Development Impact \(JEDI\) Model](#)

- ▶ [Wind Energy Finance Calculator](#)

- ▶ [Clean Power Estimator](#)

- ▶ [Economic Development Benefits of Wind Power \(PDF 281 KB\)](#)
[Download Acrobat Reader](#)

- ▶ [Wind Power Update \(PDF 1.4 MB\)](#)
[Download Acrobat Reader](#)

| Calendar | | | | | | | | | | | |
|----------|----|----|----|----|----|----|----|----|----|----|----|
| S | M | T | W | T | F | S | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | | | | | |

Wind Powering America is a commitment to dramatically increase the use of wind energy in the United States. This initiative will establish new sources of income for American farmers, Native Americans, and other rural landowners, and meet the growing demand for clean sources of electricity.

Through Wind Powering America, the United States will achieve targeted regional economic development, enhance our power generation options, protect the local environment, and increase our energy and national security.

While visiting the Wind Powering America Web site you can find state wind maps, small wind consumer's guides, wind workshops that are going on in your area, and much more. Visit the "Regional Activities" section above to read news articles, press releases, and fact sheets for the area of your interest.

Click on the map of Montana to go to the state wind maps.

Send your comments to the [Webmaster](#).

[DOE | EERE Home](#)
[Security & Privacy](#)

Search

Search Help

I Have A Question...

▶ [What is Wind Power?](#)

▶ [Where is Wind Power?](#)

▶ [How do I get Wind Power?](#)

▶ [I am interested in wind power for my home. Can you help?](#)

▶ [I have a lot of land that I think would be ideal for wind power. Where do I start?](#)

▶ [Are there any grants or incentives available to me?](#)

▶ [I am looking for a wind turbine. Can you help?](#)

14000

12000

10000

8000

6000

4000

2000

© Done

U.S. Department of Energy
Energy Efficiency and Renewable Energy *Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable*

EERE Home

Wind & Hydropower Technologies Program

[About the Program](#) |
 [Program Areas](#) |
 [Information Resources](#) |
 [Financial Opportunities](#) |
 [Technologies](#) |
 [Deployment](#) |
 [Home](#)

Wind Powering America



About Wind Powering America

Program Areas

- State
- Regional
- Native Americans
- Agricultural Sector
- Small Wind
- Public Lands
- Public Power
- Economic Development
- Policy

Perspectives

Resources & Tools

Wind Powering America is a commitment to dramatically increase the use of wind energy in the United States. This initiative will establish new sources of income for American farmers, Native Americans, and other rural landowners, and meet the growing demand for clean sources of electricity.



Through Wind Powering America, the United States will achieve targeted regional economic development, enhance our power generation options, protect the local environment, and increase our energy and national security.



While visiting the Wind Powering America Web site you can find state wind maps, small wind consumer's guides, wind workshops that are going on in your area, and much more. Visit the "State Activities" section to the left to read news articles, press releases, and fact sheets for the area of your interest.

Click on the map of Montana to go to the state wind maps.

[Printable Version](#)

Visitors Per Month

1999 – February 28, 2004

—●— WPA Visitors



[Search Help](#) » [More Search Options](#) »

[EERE Information Center](#)

■ NEWS

The Missouri Department of Natural Resources (DNR) seeks aid in study of wind patterns.
June 18, 2004
[More News](#)

■ EVENTS

Harvesting Clean Energy V
January 20, 2005
[WINDPOWER 2005](#)
May 15, 2005
[More Events](#)

■ PUBLICATIONS



State Wind Working Group Handbook
(PDF 11.3 MB)
[Download Acrobat Reader](#)
August 1, 2003



Wind Power: Options for Industry
(PDF 766 KB)
[Download Acrobat Reader](#)
March 1, 2003

[More Publications](#)

■ FEATURES

What is Wind Power?
Where is Wind Power?
How Do I Get Wind Power?

[Wind for Kids](#)
[Wind Turbine Photos](#)



[Program Home](#) | [EERE Home](#)



* In Dec. 2001, NREL started using a new Web site statistics package.

Wind Energy Finance (WEF): An Online Calculator for Economic Analysis of Wind Projects

The National Renewable Energy Laboratory created Wind Energy Finance, a free online cost of energy calculator, to enable quick, detailed economic evaluation of potential utility-scale wind energy projects.

How Does WEF Work?

Inputs

The user enters data about the project, including:

- General assumptions
- Capital costs
- Operating expenses
- Financing assumptions
- Tax assumptions
- Economic assumptions
- Financial constraining assumptions.

Extensive help notes describe each input and provide reasonable default values.

Outputs

- Minimum energy payment to meet financial criteria
- Levelized cost of energy
- Payback period
- Net present value
- Internal rate of return
- Summary and detailed cash flows.

As an alternative option, if the user enters a first-year energy payment, the program will calculate the rate of return, coverage ratios, etc.



Wind Powering America

Clean Energy for the 21st Century

What is wind energy?
Can wind power my home?
Is there enough wind where I live to produce electricity?
Can I sell electricity to the utility?

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a greener future where energy is clean, abundant, reliable, and affordable

Small Wind Electric Systems



State Wind Working Group Handbook

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Wind and Hydropower Technologies
www.eere.doe.gov/WEF

2003 Wind Energy Projects



U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a greener future where energy is clean, abundant, reliable, and affordable
www.eere.energy.gov/wind/2003projects.html

A U.S. Consumer's Guide



Wind Energy for Rural Economic Development



Job and Economic Development Impact (JEDI) Model: A User-Friendly Tool to Calculate Economic Impacts from Wind Projects

The economic impacts from wind energy project development can be significant, to both the rural counties and the state in which the project is located. The benefits that are generated by the expenditures, both during the construction and the operations phases of wind plants, depend on the extent to which those expenditures are spent locally, as well as the structure of the local and state economy. JEDI, the National Renewable Energy Laboratory's economic development model, is an easy-to-use tool that provides an approximation of the economic impacts to the local county and the state that can be generated from wind project development, during the construction phase of the project and throughout the 20- to 30-year life of the project.

Wind Powering Native America

A Tribal Road to Renewable Energy

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a greener future where energy is clean, abundant, reliable, and affordable

WPA Publications



Wind Powering* Rural Electric Cooperatives

* utility-scale

G&T's can own, purchase, or wheel wind generation

- Tri-State G&T Association, CO
- Basin Electric Power Cooperative, ND
- East River Electric Cooperative, SD
- Great River Energy, MN
- Don Bell Power Cooperative, IA
- Sunflower Electric Power Corporation, KS
- Nebraska Electric NE
- Maryland Power Cooperative, WI
- Western Farmers Electric Cooperative, OK
- Minnesota Power Cooperative, ND

Alaska Village Electric Co-op, AK

- Owner



Opportunities

- Most viable wind installations can provide local

benefits to the community.

- Many local projects can be sited to meet local

constraints.

- Many local projects have minimal distribution transmission

cost on the regional grid.

- Projects minimize transmission/distribution losses and

costs.

- A USDA/RUS financing presents a low-cost funding option.

Local energy development responds to the interests of rural

energy as a price-stable, competitive, local, clean, renewable,

energy resource.

SD

Challenges

- Distribution costs need to be reconciled the

addition of wind generation with long-

term, all-source requirements contracts.

- Small-scale local projects can be more

expensive than sited local electric cost.

- Large-scale wind projects can require new transmission construction.

Co-op's principal experience is with traditional energy resources (coal, gas, and hydro); direct experience with wind energy

is limited.

- Co-ops generally lack current information on wind energy technology, economics, operations, and engineering requirements.

Most rural co-ops have small, busy staffs with limited time for new ventures.

- There is no generally accepted interconnection standard for wind systems.

Larry Flowers, National Renewable Energy Laboratory
Phil Dougherty, U.S. Department of Energy
Steve Lindenberg and Ed Torrero, NRECA

Holy Cross Energy, CO

- Power purchaser: buys 5 MW of wind power for its customers in western Colorado
- Enrolled 2200 families, 115 businesses, and 12 local governments in landmark green energy program
- 2004 Wind Co-op of the Year

Kotzebue Electric Association, AK

- Owner
- Installed 10 65-kW turbines
- Working toward 2-4 MW of wind energy capacity
- Does not charge premium rates for the electricity generated by its wind turbines

Western Farmers Electric Co-op, OK

- Power purchaser
- Capacity: 74-25 MW
- Online 2003

Basin Electric, SD

- Power purchaser
- Capacity: 40 MW
- 2002 Wind Co-op of the Year

WPA/Utility Partnerships

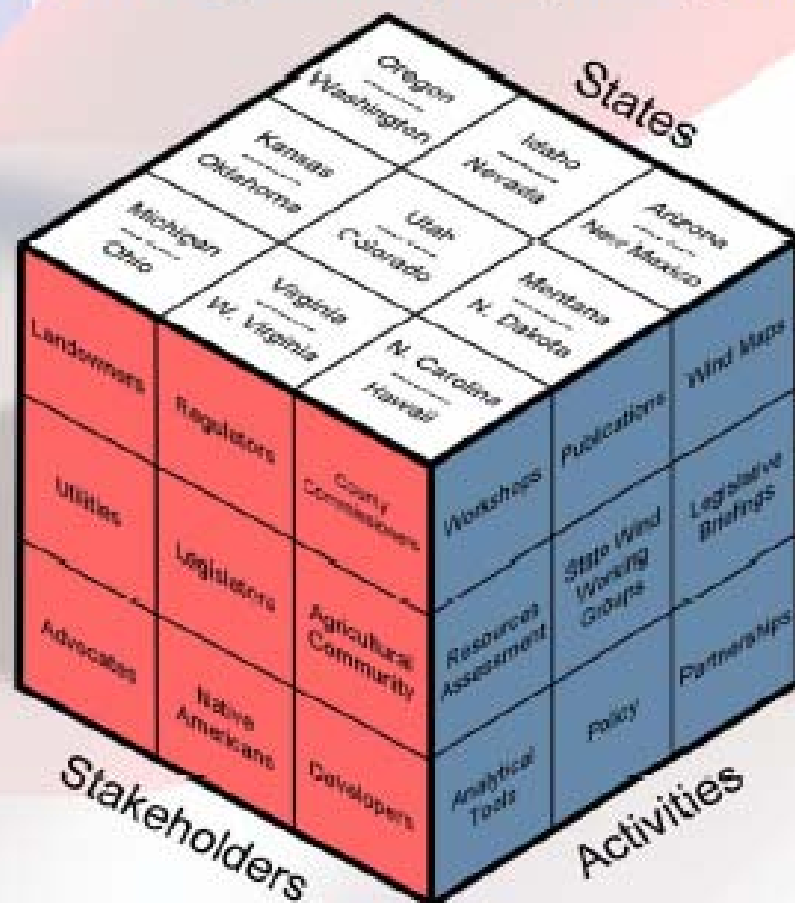
- PMA Green Taps
- Transmission Analysis
- Public Power Workshops
- Co-op Outreach
- Green Pricing Support
- Wind Energy Finance Tool
- Wind Hydro Analysis

Wind Energy Update

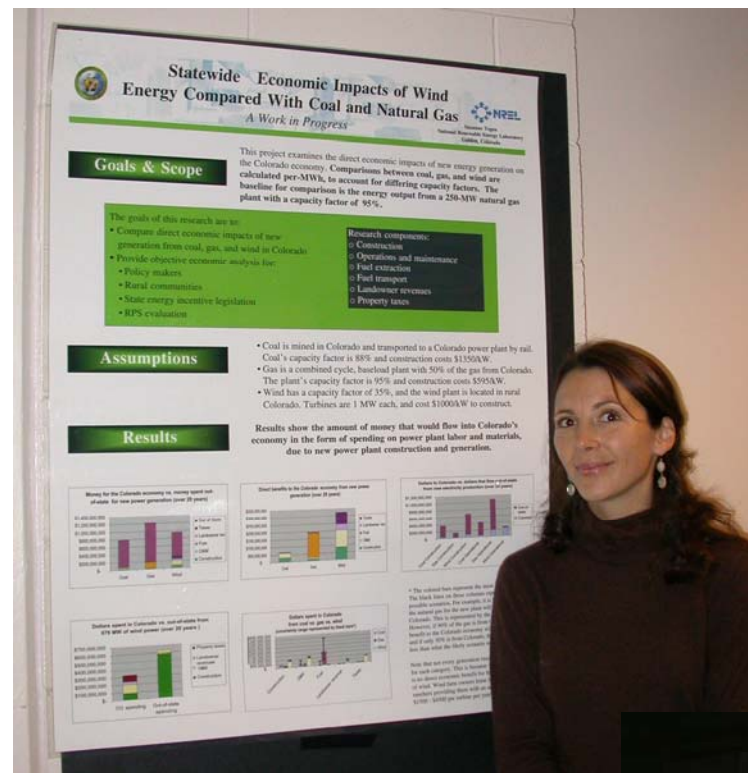


Larry Flowers
Wind Powering America
November 9, 2004

Wind Powering America (WPA) Activity Matrix



Student Projects



WPA Team

